**Request for N-STEPS Support**

**I. Contact Information**

EPA Regional Contact Information
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*If a cross-regional effort, please provide other regional contact information:

**II. Project Information**

Proposed Project Type (check all that apply)

Preliminary N-STEPS staff review and feedback on:

- ☐ Draft analysis
- ☐ Draft criteria document review

☐ Literature review

☐ Independent scientific peer review (please indicate the preferred number of reviewers)

☒ Data analysis and presentation

☐ Workshop/Training

Proposed Project Description Project timeframe: July 1, 2013 through June 30, 2014
Estimated level of effort and cost: XXXX
Applicable State(s): New Mexico
Waterbody type(s): All wadeable perennial streams/rivers
Parameter(s): Total Nitrogen and Total Phosphorous
Does State have a mutually-agreed upon nutrient criteria plan?
Y ☒ N ☐

Has the State submitted milestone dates for the associated WQ PAM?
Y ☒ N ☐

Is the project associated with milestones in the State's mutually-agreed upon nutrient criteria plan?
Y ☒ N ☐
If yes, please provide a description of the associated milestone with a reference to the plan language.

From Table 1 of New Mexico's Nutrient Reduction Strategy for Protecting and Improving Water Quality (2012) the following milestone is listed with a 2014 target date:

Change-point analysis to link TN and TP concentrations to a biological response (benthic macroinvertebrates).

- Evaluate and revise numeric nutrient thresholds (TN and TP) based on new information.
- Refine nutrient AP for wadeable, perennial streams.

If no, please describe how the project supports the State's efforts to adopt numeric nutrient criteria.

Project Summary:

The United States Environmental Protection Agency (USEPA) nutrient criteria guidance recommends that criteria be derived for both total nitrogen (TN) and total phosphorus (TP) (primary causal variables) and chlorophyll a and clarity (primary response variables) that are protective of designated uses. The guidance does not preclude the use of alternative causal or response variables, and suggest several additional variables such as dissolved oxygen, trophic state indices, and biocriteria (USEPA 2000). EPA recommends three methods to establish nutrient criteria (USEPA 2000): a frequency distribution reference-based approach, a stressor-response approach, and literature-derived values. ***We are proposing the use of the stressor-response relationships in developing thresholds using datasets collected by the State of New Mexico and the National Aquatic Resource Surveys. This analysis will use concurrently measured cause and response variables including nutrients and other related water quality parameters, as well as biological data, i.e., algal and benthic macroinvertebrate community composition and chlorophyll a concentration.***

While a few streams have segment specific numeric criteria for total phosphorus, the State of New Mexico currently has no general numeric criteria for nutrients. The narrative criterion in the State of New Mexico Standards for Interstate and Intrastate Surface Waters found at § 20.6.4.13 NMAC provides that (NMWQCC 2011) "Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state." Towards the implementation of this narrative criterion, ***New Mexico has adopted an assessment method applicable to wadeable perennial streams that evaluates nutrient impairment for the purpose of Clean Water Act § 303(d) listing and TMDL development***. The wadeable stream assessment utilizes a weight-of-evidence approach that includes algae coverage, periphyton coverage, anaerobic conditions, dissolved oxygen, pH, total nitrogen (TN), total phosphorus (TP), and quantitative measures of both stressor and response variables (USEPA 2010) using either a threshold or, in unique cases, reference-based approach (USEPA 2000). The State's use of the nutrient assessment protocol has resulted to date in 61 EPA approved nutrient TMDLs, i.e., TN and/or TP. Unfortunately, the NMED assessment for nutrients, while successfully implemented, is based on thresholds that were derived from a frequency distribution curve and are not directly linked to undesirable responses nor use impairment. Also the reference-based approach is resource intensive and requires identification of a specific reference site for comparison versus identification of a reference condition (Stoddard et al. 2006), which reduces the potential for bias.

A stepwise criteria development approach is being proposed as described in Empirical Approaches for Nutrient Criteria Derivation (USEPA 2009) for the nutrient development protocol framework, except the goal at this time is to propose numeric translators for New Mexico's narrative nutrient water quality standard rather than actual water quality criteria until the numeric translators have been successfully tested through bioconfirmation. The Empirical Approach for Nutrient Criteria framework includes five steps, (1) Selecting and Evaluating Data; (2) Assessing the Strength of the Cause-Effect Relationship; (3) Analyzing Data; (4) Evaluating Estimated Stressor-Response relationship; and (5) Evaluating Candidate Stressor-Response Criteria. Toward this end New Mexico, working with Tetra Tech, has recently conducted a preliminary analysis that undertook Step 1 and started the analysis for Steps 2 and 3. ***Here we will continue to pursue this Nutrient Criteria Framework by undertaking the following scope of work:***

1. Evaluate the current nutrient stream classifications based on ecoregion and aquatic life use using PCA analysis. Determine the simplest stream classification that captures the environmental variability within New Mexico.

2. Refine reference site designations. In this step a Human Disturbance Gradient approach may be used for reference site selection and to discern the gradient of sites within select stream classifications. EPA Region 6 and NMED will provide GIS analysis of sites to support this task.

3. Update potential TN and TP and response variable thresholds based on analysis of reference condition and Human Disturbance Gradient, if available.

4. Conduct analysis of stressor –response relationships focusing on measures of dissolved oxygen and periphyton chlorophyll *a* concentration which are typically the identified response variables in waters listed as nutrient impaired by NMED . Other potential response variables, including macroinvertebrate metrics, will be evaluated if resources allow.

5. Evaluate results to develop a candidate stressor-response assessment approach for New Mexico's wadeable streams that would: 1) update New Mexico's current approach based on more data and a more robust analysis and 2) refine both cause and response variable thresholds using multiple lines of evidence to test as potential numeric nutrient criteria

6. Explore translating the weight of evidence approach in the wadeable streams assessment into a trophic index score (i.e., combining the results from the cause and response variables into one score rated 0 – 100 that can be used to evaluate use attainment in the stream).

First time request?
Y ☒ N ☐
If not, please provide details of previous request(s):

Date of request(s):

Associated with previous N-STEPS support?
Y ☐ N ☒
If yes, please provide details of associated work:

Date of request(s):

N-STEPS project period of performance (approximate):

Brief description of associated work:

Applicable State(s):

**III. Cost-share Information (if applicable)**

Is the Region(s) providing funding support?
Y ☐ N ☐
If yes, what degree of support?

Please provide procurement information to N-STEPS Program Manager after EHPB approval.